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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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INTEL CORPORATION c/o INTELLEVATE, LLC P.O. BOX 52050 MINNEAPOLIS, MN 55402			EXAMINER NGUYEN, THANH T	
			ART UNIT 2144	PAPER NUMBER
			MAIL DATE 08/06/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

09/576,038

Applicant(s)

HEFTY ET AL.

Examiner

Tammy T. Nguyen

Art Unit

2144

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 32-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 32-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.



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***Detailed Office Action***

1. This action is responsive to the amendment filed on May 29, 2007.
2. Claim 56 is newly added.
3. Claims 32-56 are pending.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 32-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beshai et al., (hereinafter Beshai) U.S. Patent No. 6,721,271 in view of Massa et al., (hereinafter Massa) U.S. Patent No. 6,658,469 further in view of Phil Edholm., (hereinafter Edholm) U.S. Patent No. 6,600,721.
6. As to claims 32, Beshai discloses the invention substantially as claimed, Beshai teaches including a method comprising: if an amount of data located in a first memory buffer in a

local system does not exceed a maximum transfer size for a single memory to memory [see col.12, lines 26-40 (the number segments in the buffer equal or exceeds the parcel size)] associating the data with a first transfer operation (see col.14, line 65 to col.15, line 28); and if the amount of data associated with the first transfer operation has not reached the maximum transfer capacity, associating data for the RDMA request located in one or more portions of one or more other memory buffers with the first transfer operation (see col.18, lines 9-35). But Beshai does not explicitly disclose transfer operation over a data network to a remote memory in a remote system with other memory buffers in the local system associated with a remote direct memory access (RDMA) request.

7. In the same field of endeavor, Massa discloses (e.g., method and system for switching between network transport providers). Massa discloses transfer operation to a remote memory in a remote system with other memory buffers in the local system [see fig.5 of Massa and col. 13, lines 30-63] (SAN provider supports transferring data directly from a remote buffer to a specified local buffer through RDMA read operations).
8. Accordingly, It would have been obvious to one of ordinary skill in the networking art at the time of the invention was made to have incorporated Eydelman's teaching of method and system for switching between network transport providers with the teaching of Beshai to have transferring operation to a remote memory in a remote system with other memory buffers in the local system for the purpose of maximizing the communication bandwidth and minimizing the communication latency observed by the communicating applications[see Massa col.3, line 66 to col.4, line 2]. However, Beshai does not

explicitly teach data is to be transferred in a single transfer operation to a remote memory buffer.

9. In the same field of endeavor, Edholm discloses (e.g., end node pacing for QOS and bandwidth management). Edholm discloses data is to be transferred in a single transfer operation to a remote memory buffer [see Edholm col.4, lines 4-15 (transfer the packet to a memory buffer)].
10. Accordingly, It would have been obvious to one of ordinary skill in the networking art at the time of the invention was made to have incorporated Edholm's teaching of end node pacing for QOS and bandwidth management with the teaching of Beshai for the purpose of provide to increase the complexity and expense of the network system [see Edholm col.1, lines 45-50]. Thus, Beshai provides the motivation by stating providing for transfer to be simpler, and therefore faster and easier to scale up [see Beshai, col.4, lines 39-40].
11. As to claim 33, Beshai teaches the invention as claimed, additionally comprising transferring the data associated with the first transfer operation (see abstract).
12. As to claim 34, Beshai teaches the invention as claimed, additionally comprising associating a descriptor with the first transfer operation (see col. 10, lines 48-65), the description to specify the remote memory buffer to which the data is to be transferred and to indicate a portion of data remaining to be transferred for the RDMA request.
13. As to claim 35, Beshai teaches the invention as claimed, additionally comprising associating data with one or more subsequent transfer operations (see col. 17, lines 18-51).

14. As to claim 36, Beshai teaches the invention as claimed, wherein the first and one or more subsequent transfer operations are performed in response to one or more RDMA (Remote Direct Memory Access) requests (see fig.16 memory 0).
15. As to claim 37, Beshai teaches the invention as claimed, additionally comprising: if the amount of data located in the first memory buffer exceeds the maximum transfer size: associating a portion of the data with the first transfer operation: and associating one or more subsequent portions of the data with one or more subsequent transfer operations (see col.17, lines1-67).
16. As to claim 38, Beshai teaches the invention as claimed, additionally comprising: associating a descriptor with the first transfer operation; and transferring the data associated with the first transfer operation (see abstract), the description to specify the remote memory buffer to which the data is to be transferred and to indicate a portion of data remaining to be transferred for the RDMA request.
17. As to claim 39, Beshai teaches the invention as claimed, additionally comprising: associating a descriptor with each of the one or more subsequent transfer operations; and transferring the data associated with the one or more subsequent transfer operations (see col.17, lines 1-67).
18. As to claim 40, Beshai discloses the invention substantially as claimed, Beshai teaches teach including an apparatus comprising: an RDMA (remote direct memory access) manager operable to service one or more RDMA requests (see Fig.1), and to: determine if an amount of data looted in a first memory buffer exceeds a maximum transfer size [see col.12, lines 26-40 (the number segments in the buffer equal or exceeds the parcel size)],

and: if it is determined that the amount of data located in a first memory buffer does not exceed the maximum transfer size [see col.12, lines 26-40 (the number segments in the buffer equal or exceeds the parcel size)], then associate the data with a first transfer operation (see col.14, line 65 to col.15, line 28); and if the amount of data an associated with the first transfer operation has not reached the maximum transfer size, associate data located in one or more portions of one or more other memory buffers with the first transfer operation (see col.18, lines 9-35). But Beshai does not explicitly disclose transfer operation to a remote memory in a remote system with other memory buffers in the local system.

19. In the same field of endeavor, Massa discloses (e.g., method and system for switching between network transport providers). Massa discloses transfer operation to a remote memory in a remote system with other memory buffers in the local system [see fig.5 of Eydelman and col. 13, lines 30-63] (SAN provider supports transferring data directly from a remote buffer to a specified local buffer through RDMA read operations).
20. Accordingly, It would have been obvious to one of ordinary skill in the networking art at the time of the invention was made to have incorporated Massa's teaching of method and system for switching between network transport providers with the teaching of Beshai to have transferring operation to a remote memory in a remote system with other memory buffers in the local system for the purpose of maximizing the communication bandwidth and minimizing the communication latency observed by the communicating applications[see Massa col.3, line 66 to col.4, line 2]. However, Beshai does not

explicitly teach data is to be transferred in a single transfer operation to a remote memory buffer.

21. In the same field of endeavor, Edholm discloses (e.g., end node pacing for QOS and bandwidth management). Edholm discloses data is to be transferred in a single transfer operation to a remote memory buffer [see Edholm col.4, lines 4-15 (transfer the packet to a memory buffer)].
22. Accordingly, It would have been obvious to one of ordinary skill in the networking art at the time of the invention was made to have incorporated Edholm's teaching of end node pacing for QOS and bandwidth management with the teaching of Beshai for the purpose of provide to increase the complexity and expense of the network system [see Edholm col.1, lines 45-50]. Thus, Beshai provides the motivation by stating providing for transfer to be simpler, and therefore faster and easier to scale up [see Beshai, col.4, lines 39-40].
23. As to claim 41, Beshai teaches the invention as claimed, the RDMA manager additionally operable to transfer the data associated with the first transfer operation (see abstract).
24. As to claim 42, Beshai teaches the invention as claimed, the RDMA manager additionally operable to associate data with one or more subsequent transfer operations (see col.17, lines 1-67).
25. As to claim 43, Beshai teaches the invention as claimed, the RDMA manager additionally operable to: determine if the amount of data located in the first memory buffer exceeds the maximum transfer size, and: if the amount of data located in the first memory buffer exceeds the maximum transfer size: associate a portion of the data and a descriptor with the first transfer operation; and associate one or more subsequent, portions of the data



with one or more subsequent transfer operations (see fig.17), the description to specify the remote memory buffer to which the data is to be transferred and to indicate a portion of data remaining to be transferred for the RDMA request.

26. Claim 48 has similar limitations as claim 32; therefore, it is rejected under the same rationale.

27. Claim 53 has similar limitations as claim 43; therefore, it is rejected under the same rationale.

28. Claims 49-52 have similar limitations as claims 33-36; therefore, they are rejected under the same rationale.

29. Claims 54, and 55 have similar limitations as claims 38, and 39; therefore, they are rejected under the same rationale.

30. Claims 44-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beshai et al., (hereinafter Beshai) U.S. Patent No. 6,721,271, in view of Massa et al., (hereinafter Massa) U.S. Patent No. 6,658,469 in view of Phil Edholm., (hereinafter Edholm) U.S. Patent No. 6,600,721 further in view of Mauger et al., (hereinafter Mauger) U.S. Patent No. 6,917,586.

31. As to claim 44, Beshai discloses the invention substantially as claimed, Beshai teach including a system comprising: a host fabric adapter; and an RDMA (remote direct memory access) manager included in a software stack of the host fabric adapter, the RDMA manager operable to service one or more RDMA requests (see fig.16), and to:

determine if an amount of data located in a first memory buffer exceeds a maximum transfer size [see col.12, lines 26-40 (the number segments in the buffer equal or exceeds the parcel size)] and; if it is determined that the amount of data located in the first memory buffer does not exceed the maximum transfer size, then associate the data with a first transfer operation (see col.14, line 65 to col.15, line 28.): and if the amount of data associated with the first transfer operation has not reached the maximum transfer size, associate data located in one or more portions of one or more other memory buffers of the plurality of memory buffers with the first transfer operation (see col.18, lines 9-35, and col.13, lines 9-17). But Beshai does not explicitly disclose transfer operation to a remote memory in a remote system with other memory buffers in the local system.

32. In the same field of endeavor, Massa discloses (e.g., method and system for switching between network transport providers). Massa discloses transfer operation to a remote memory in a remote system with other memory buffers in the local system [see fig.5 of Massa and col. 13, lines 30-63] (SAN provider supports transferring data directly from a remote buffer to a specified local buffer through RDMA read operations).
33. Accordingly, It would have been obvious to one of ordinary skill in the networking art at the time of the invention was made to have incorporated Massa's teaching of method and system for switching between network transport providers with the teaching of Beshai to have transferring operation to a remote memory in a remote system with other memory buffers in the local system for the purpose of maximizing the communication bandwidth and minimizing the communication latency observed by the communicating applications[see Massa col.3, line 66 to col.4, line 2]. But Beshai does not explicitly

teach fabric adapter. However, Mauger teaches fabric adapter (fig.3)(see 8, line 58 to col.9, line 35). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement the teachings of Mauger into the computer system of Beshai to have fabric adapter because it would have an efficient system that can provide specific functions that enable any-server-to-any-storage device connectivity through the use of Fibre Channel switching technology. However, Beshai does not explicitly teach data is to be transferred in a single transfer operation to a remote memory buffer.

34. In the same field of endeavor, Edholm discloses (e.g., end node pacing for QOS and bandwidth management). Edholm discloses data is to be transferred in a single transfer operation to a remote memory buffer [see Edholm col.4, lines 4-15 (transfer the packet to a memory buffer)].
35. Accordingly, It would have been obvious to one of ordinary skill in the networking art at the time of the invention was made to have incorporated Edholm's teaching of end node pacing for QOS and bandwidth management with the teaching of Beshai for the purpose of provide to increase the complexity and expense of the network system [see Edholm col.1, lines 45-50]. Thus, Beshai provides the motivation by stating providing for transfer to be simpler, and therefore faster and easier to scale up [see Beshai, col.4, lines 39-40].
36. Claim 45 has similar limitations as claim 41; therefore, it is rejected under the same rationale.
37. Claim 46 has similar limitations as claim 42; therefore, it is rejected under the same rationale.

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38. Claim 47 has similar limitations as claim 43; therefore, it is rejected under the same rationale.

39. Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beshai et al., (hereinafter Beshai) U.S. Patent No. 6,721,271, in view of Massa et al., (hereinafter Massa) U.S. Patent No. 6,658,469 in view of Phil Edholm., (hereinafter Edholm) U.S. Patent No. 6,600,721 in view of Mauger et al., (hereinafter Mauger) U.S. Patent No. 6,917,586 further in view of Landy Wang., (hereinafter Wang) U.S. Patent No. 6,477,612.

40. As to claim 56, Beshai does not explicitly disclose the method of claim 32, wherein the RDMA request is received via single function call.

41. In the same field of endeavor, Wang discloses (e.g., Providing access to physical memory allocated to a process by selectively mapping pages of the physical memory with virtual memory allocated to the process). Wang discloses the RDMA request is received via single function call [see col.17, 23-27] (configured with a set of function calls to receive the allocation request for virtual memory, the allocation request).

42. Accordingly, It would have been obvious to one of ordinary skill in the networking art at the time of the invention was made to have incorporated Wang's teaching of Providing access to physical memory allocated to a process by selectively mapping pages of the physical memory with virtual memory allocated to the process with the teaching of Beshai to have the RDMA request is received via single function call, for the purpose of improved performance, and enabling access to larger amounts of memory via a virtual

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address, essentially by adjusting a pointer in a straightforward manner, and without copying of the data[see col.2 Lines 52-57].

### ***Response to Arguments***

43. Applicant's arguments with respect to claim 56 has been considered but are moot in view of the new ground(s) of rejection. Applicant's arguments include the failure of previously applied art to expressly disclose of amount of data located in a first memory buffer in a local system associated with a remote direct memory access (RDMA) request" or "a single memory to memory transfer operation over a data network to a remote memory buffer in a remote system" (see Applicant's response, Dated 29, 2007, Page 9). It is evident from the detailed mappings found in the above rejection(s) that Massa and Beshai disclosed this functionality (see fig.5 of Massa and col. 13, lines 30-63] (SAN provider supports transferring data directly from a remote buffer to a specified local buffer through RDMA read operations). Further, it is clear from the numerous teachings (previously and currently cited). Thus, Applicant's arguments drawn toward distinction of the claimed invention and the prior art teachings on this point are not considered persuasive.

44. Accordingly, claims 32-56 are respectfully rejected.

### ***Conclusion***

45. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

46. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tammy T. Nguyen whose telephone number is 571-272-3929. The examiner can normally be reached on Monday - Friday 8:30 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ***William Vaughn*** can be reached on 571-272-3922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the


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July 26, 2007



WILLIAM VAUGHN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100